What is claimed is:

1. A charged particle beam alignment method which performs an axis alignment for a lens and uses a charged particle beam apparatus having a lens for converging a charged particle beam emitted from a charged particle source and forming a sample image by detecting secondary charged particles emitted from a sample by radiating the charged particle beam onto the sample converged by the lens, the method comprising the steps of:

changing a convergence condition of said objective lens to two states when a deflection condition of said alignment deflector is rendered to a first state;

detecting a first deviation between first and second sample images obtained when the deflection condition of said alignment deflector is rendered to the first state;

changing the convergence condition of said objective lens to at least two states when the deflection condition of said alignment deflector is rendered to a second state;

detecting a second deviation between third and fourth sample images obtained when the deflection condition of said alignment deflector is rendered to the second state;

calculating an unknown changing depending on an operation condition of said charged particle beam optical system by applying information of the first and second deviations to an equation finding the deviation of the sample image relative to a change of an alignment condition; and

obtaining the alignment condition based on the calculated unknown and a condition in which an image deviation becomes small when the convergence condition of the objective lens is changed to the two condition.

2. A charged particle beam alignment method which performs an axis alignment for an astigmatism corrector by an alignment deflector and uses a charged particle beam apparatus having an astigmatism corrector for performing an astigmatism

correction of the charged particle beam emitted from a charged particle source and forming a sample image by detecting secondary charged particles emitted from a sample by radiating said charged particle beam corrected by said astigmatism corrector onto the sample, the method comprising the steps of:

changing a correction condition of said astigmatism corrector to two states when a deflection condition of said alignment deflector is rendered to a first state;

detecting a first deviation between first and second sample images obtained when the deflection condition of said alignment deflector is rendered to the first state;

changing the correction condition of said astigmatism corrector to at least two states when the deflection condition of said alignment deflector is rendered to a second state;

detecting a second deviation between third and fourth sample images obtained when the deflection condition of said alignment deflector is rendered to the second state;

calculating an unknown changing depending on an optical condition of said charged particle beam by applying information of the first and second deviations to an equation finding the deviation of the sample image relative to a change of an alignment condition; and

obtaining the alignment condition based on the calculated unknown and a condition in which an image deviation becomes small when the correction condition of the astigmatism corrector is changed to the two condition.

3. A charged particle beam alignment method which performs an axis alignment for an optical condition of a charged particle beam and uses a charged particle beam apparatus having an optical device for changing the charged particle beam emitted from a charged particle source and forming a sample image by detecting secondary charged particles emitted from a sample by radiating said charged particle beam onto the sample, which is changed by the optical device, the method comprising the

steps of:

detecting a first sample image when said optical condition is rendered to a first state;

changing said optical condition;

detecting a second sample image when said optical condition is rendered to said first state again;

detecting a deviation between said first and second sample images; and

calculating correction conditions of said sample images based on the detected deviation.

4. A charged particle beam apparatus which forms a sample image based on an output of a detector and has a charged particle source, a lens for converging a charged particle beam emitted from the charged particle source, an alignment deflector for performing an axis alignment of the said charged particle beam for the convergence lens, and the detector for detecting secondary charged particles emitted from a sample by radiating said charged particle beam thereonto, the charged particle beam apparatus comprising:

a memory for memorizing first and second sample images obtained by changing a convergence condition of said lens to two states when a deflection condition of said alignment deflector is rendered to a first state and for memorizing third and fourth sample images obtained by changing the convergence condition of said lens to two states when the deflection condition of said alignment deflector is changed to a second condition; and

a control device for calculating an aligner condition of said alignment deflector based on a first deviation between said first and second sample images and a second deviation between said third and fourth sample images.

5. The charged particle beam apparatus according to claim 4, wherein said control device calculates said aligner condition based on a condition in which the deviation

between sample images obtained by changing the condition of said convergence lens to the two states.

6. The charged particle beam apparatus according to claim 4, wherein said control device controls said lens and said alignment deflector so that said first and third sample images are obtained by rendering said alignment deflector from the first state to the second state in a state where said lens is rendered to a certain convergence condition and then said second and fourth sample images are obtained in a state where said lens is rendered to other convergence conditions.

7. The charged particle beam apparatus according to claim 4, wherein said control device acquires at least said four sample images and then restores the deflection condition of the alignment deflector to an optical condition when said first sample image is acquired, thus calculating a drift amount based on the deviation between both sample images.

8.. A charged particle beam apparatus which forms a sample image based on an output of a detector and has a charged particle source, an astigmatism corrector for performing an astigmatism correction of a charged particle beam emitted from the charged particle source, an alignment deflector for performing an axis alignment of the said charged particle beam for said astigmatism corrector, and the detector for detecting secondary charged particles emitted from a sample by radiating said charged particle beam thereonto, the charged particle beam apparatus comprising:

a memory for memorizing first and second sample images obtained by changing a correction condition of said astigmatism corrector when a deflection condition of said alignment deflector is rendered to a first state and for memorizing third and fourth sample images obtained by changing the correction condition of said astigmatism corrector to two states when the deflection condition of said alignment deflector is changed to a second condition; and

a control device for calculating an aligner condition of said alignment

deflector based on a first deviation between said first and second sample images and a second deviation between said third and fourth sample images.

9. The charged particle beam apparatus according to claim 8, wherein said control device calculates said aligner condition based on a condition in which the deviation between sample images obtained by changing the condition of said convergence lens to the two states.

10. The charged particle beam apparatus according to claim 8, wherein said control device acquires at least said four sample images and then restores the deflection condition of the alignment deflector to an optical condition when said first sample image is acquired, thus calculating a drift amount based on the deviation between both sample images.

11. A charged particle beam apparatus which forms a sample image based on an output of a detector and has a charged particle source, a lens for converging a charged particle beam emitted from the charged particle source, an alignment deflector for performing an axis alignment of the said charged particle beam, and the detector for detecting secondary charged particles emitted from a sample by radiating said charged particle beam thereonto, the charged particle beam apparatus comprising:

means for calculating an alignment condition by said alignment deflector based on information obtained from said sample image;

means for deciding whether the information obtained from said sample image is suitable for a calculation of the alignment condition; and

means for generating an alarm when it is decided by said means that the information obtained from said sample image is not suitable for the calculation of the alignment condition.

12. A charged particle beam apparatus which forms a sample image based on an output of a detector and has a charged particle source, a lens for converging a

charged particle beam emitted from the charged particle source, an alignment deflector for performing an axis alignment of the said charged particle beam, and the detector for detecting secondary charged particles emitted from a sample by radiating said charged particle beam thereonto, the charged particle beam apparatus comprising:

means for calculating an alignment condition by said alignment deflector based on information obtained from said sample image;

means for quantizing an image of said sample image; and

means for generating an alarm when a quantization value quantized by said quantizing means is equal to a predetermined value or less or when the quantization value is less than the predetermined value.

13. A charged particle beam apparatus which forms a sample image based on an output of a detector and has a charged particle source, a lens for converging a charged particle beam emitted from the charged particle source, an alignment deflector for performing an axis alignment of the said charged particle beam, and the detector for detecting secondary charged particles emitted from a sample by radiating said charged particle beam thereonto, the charged particle beam apparatus comprising:

means for measuring a width of an object on said sample based on a line profile obtained by scanning said charged particles on said sample one-dimensionally or two-dimensionally;

means for calculating an alignment amount by said alignment deflector based on information obtained from said sample image;

means for deciding whether the information obtained from said sample image is suitable for a calculation of the alignment amount; and

means for registering at least one of said sample image, said line profile and an optical condition of said charged particle beam when it is decided that the

information is not suitable for the calculation of the alignment amount by the deciding means.

14. A charged particle beam apparatus which forms a sample image based on an output of a detector and has a charged particle source, a lens for converging a charged particle beam emitted from the charged particle source, an alignment deflector for performing an axis alignment of the said charged particle beam, and the detector for detecting secondary charged particles emitted from a sample by radiating said charged particle beam thereonto, the charged particle beam apparatus comprising:

means for measuring a width of an object on said sample based on a line profile obtained by scanning said charged particles on said sample one-dimensionally or two-dimensionally;

means for calculating an alignment amount by said alignment deflector based on information obtained from said sample image;

means for quantizing an image of said sample image; and

means for registering at least one of said sample image, said line profile and an optical condition of said charged particle beam when a quantization value quantized by said quantizing means is equal to a predetermined value or less or when the quantization value is less than the predetermined value.

15. A charged particle beam alignment method which performs an axis alignment of a charged particle beam for an optical device by an alignment deflector and uses a charged particle beam apparatus having an optical device for changing the charged particle beam emitted from a charged particle source and forming a sample image by detecting secondary charged particles emitted from a sample by radiating said charged particle beam onto the sample, which is changed by the optical device, the method comprising the steps of:

changing said optical device to at least two states when a deflection condition

of said alignment deflector is rendered to a first state;

detecting a first deviation between first and second sample images obtained when the deflection condition of said alignment condition is rendered to the first state;

changing the optical device to at least two conditions when the deflection condition of said alignment deflector is rendered to a second state;

detecting a second deviation between third and fourth sample images obtained when the deflection condition of said alignment deflector is rendered to the second state; and

determining an operation condition of said alignment deflector based on information of the first and second deviations.

16. A charged particle beam apparatus which has a charged particle source, an optical device for aligning a charged particle beam emitted from the charged particle source, and an alignment deflector for performing an axis alignment for the optical device, the charged particle beam apparatus comprising:

calculation means for calculating a deflection amount of said alignment deflector; wherein

a plurality of calculation methods for calculating said deflection amount are memorized in said calculation means, and selection means for selecting at least one of the calculation methods is provided.

17. The charged particle beam apparatus according to claim 16, wherein said calculation means calculates the deflection amount of said alignment deflector based on a movement amount between a plurality of images obtained when a condition of said optical device is changed.

18. The charged particle beam apparatus according to claim 16, wherein said calculation means calculates the deflection amount of said alignment deflector based on a movement amount between a plurality of images, and the number of the images

provided for a calculation changes depending on a selection of the calculation method by said selection means.

19. The charged particle beam apparatus according to claim 16,

wherein said calculation means computes a predetermined variable based on a movement amount between a plurality of images obtained when a condition of said optical device is changed and calculates a change amount of said alignment deflector based on the predetermined variable, and

wherein the number of the images provided for a calculation changes depending on a selection of the calculation method by said selection means.

20. A charged particle beam apparatus which has a charged particle source, an optical device for aligning a charged particle beam emitted from the charged particle source, and an alignment deflector for performing an axis alignment for the optical device, the charged particle beam apparatus comprising:

calculation means for calculating a deflection amount of said alignment deflector, wherein

a processing by said calculation means is performed again when the deflection amount calculated by said calculation means is equal to a predetermined value or more or when said deflection amount is more than the predetermined value.

21. A charged particle beam apparatus which has a charged particle source, an optical device for aligning a charged particle beam emitted from the charged particle source, and an alignment deflector for performing an axis alignment for the optical device, the charged particle beam apparatus comprising:

means for detecting centers of gravity of patterns of two images obtained when a condition of said optical device is changed;

means for detecting a deviation between the centers of gravity of the patterns of said two images; and

means for calculating a deflection amount of said alignment deflector based

on the deviation between the centers of gravity of the patterns of said two images.

22. A charged particle beam apparatus which has a charged particle source; an astigmatism corrector for performing an astigmatism correction of a charged particle beam emitted from said charged particle source; an objective lens disposed between said astigmatism corrector and a sample onto which said charged particle beam is radiated, the objective lens converging said charged particle beam; a first alignment deflector for aligning an optical axis of said charged particle beam with said astigmatism corrector; and a second alignment corrector for aligning the optical axis of said charged particle beam with said objective lens, the charged particle beam apparatus comprising:

control means for performing a focus adjustment by use of said objective lens, for performing an axis alignment by use of said first alignment deflector, for performing an axis alignment by use of said second alignment deflector, and for performing an astigmatism correction by use of said astigmatism corrector.

23. A charged particle beam apparatus which has a charged particle source; an optical device for aligning a charged particle beam emitted from said charged particle source; an alignment deflector for performing an axis alignment with said optial device; and an image display device for displaying an image based on a secondary charged particle beam emitted from a sample by radiation of said charged particle beam, the charged particle beam apparatus comprising:

calculation means for calculating a deflection amount of the alignment deflector based on a movement amount between a plurality of images obtained when a condition of said optical device is changed, wherein

the plurality of images obtained when the condition of said optical device is changed are displayed in said image display device.